REMARKS

Claims 1-2 and 4-27 are pending in the present application. By this reply, claim 3 has been cancelled and new claims 15-27 have been added.

The specification has been amended to correct minor informalities and to improve its form according to U.S. practice. These modifications do not add any new matter to the disclosure.

CORRECTED FORMAL DRAWINGS

In response to the Office Action, corrected formal drawings have been filed herein with a Letter to the Official Draftsperson.

ALLOWABLE SUBJECT MATTER

Applicant appreciates the Examiner's indication that claims 3-4, 6 and 9-13 are objected to as being dependent upon a rejected base claim, but will be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Accordingly, independent claims 1 and 14 have been amended to incorporate therein allowable claim 3. Further, the new claims contain the allowable subject matter of claim 9.

Thus, all of the pending claims now contain allowable subject matter indicated by the Examiner, and the present application is in condition for allowance.

35 U.S.C. §§ 102 AND 103 REJECTION

Claims 1-2, 5 and 7-8 have been rejection under 35 U.S.C § 102(e) as being anticipated by *Karidi* (U.S. Patent No. 6,2222,641). Claim 14 has been rejected under 35 U.S.C § 102(e) as being anticipated by *Boon* (U.S. Patent No. 6,360,014).

Without acquiescing to any of the Examiner's allegations made in rejecting these claims in the Office Action, as discussed above, independent claims 1 and 14 have been amended to incorporate therein the allowable subject matter of claim 3 to expedite prosecution and to place the application in condition for allowance. Accordingly, the rejections are moot and reconsideration and withdrawal of the rejections based on these reasons is respectfully requested.

CONCLUSION

For the foregoing reasons and in view of the above clarifying amendments, Applicant respectfully requests the Examiner to reconsider and withdraw all of the objections and rejections of record, and earnestly solicits an early issuance of a Notice of Allowance.

Should there be any outstanding matters which need to be resolved in the present application, the Examiner is respectfully requested to contact Esther H. Chong (Registration No. 40,953) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

Attached hereto is a marked-up version of the changes made to the application by this Amendment.

Applicant(s) respectfully petitions under the provisions of 37 C.F.R. § 1.136(a) and 1.17 for a one month extension of time in which to respond to the Examiner's Office Action. The Extension of Time Fee in the amount of $110.00 is attached hereto.

If necessary, the Commissioner is hereby authorized in this, concurrent, and further replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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JAK/EHC:lmh
Enclosure: Version with Markings to Show Changes Made

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Specification

The specification has been amended as follows:

On page 3, lines 1-9 have been amended as follows:

--However, information of the original image signal is lost during the process of coding the image signal described above, especially during the quantization process, thereby causing blocking artifacts and ringing effects to the image which is reconstructed in the decoder. The blocking artifacts imply irregularity between the blocks generated due to information loss resulting from the quantization of the low-frequency DCT coefficients, and the ringing effects result[s] from quantization errors of the high-frequency DCT coefficients.--

On page 5, lines 20-24 have been amended as follows:

--It is therefore an [a primary] object of the present invention to provide a method for restoring a compressed image of an image processing system and an apparatus therefor which can reduce the blocking artifacts and ringing effects generated in a restored image signal.--

On page 6, the following paragraph was added after line 14:

--These and other objects of the present application will become more readily apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.--

On page 7, lines 2-7 have been amended as follows:

--Figure 3 is a block diagram illustrating an apparatus for restoring a compressed image of an image processing system in accordance with an embodiment of the present invention;

Figure 4 illustrates an example of a configuration of original pixels in a block of an original image in accordance with the present invention;--

On page 7, lines 14-16 have been amended as follows:

--Figure 7 illustrates a flowchart of the apparatus for restoring the compressed image of the image processing system in accordance with an embodiment of the present invention.--

On page 7, the heading at line 18 has been amended as follows:

--DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS [INVENTION]--

In the Claims

Claim 3 has been cancelled.

The claims have been amended as follows:

1. (Amended) A method for restoring a compressed image of an image processing system, comprising:

a step for defining a smoothing functional having a smoothing degree of an image and reliability for an original image by pixels having an identical property in image block units; and

a step for computing a restored image by performing a gradient operation on the smoothing functional in regard to the original image[.];

wherein the smoothing functional M(f) comprises a sum of a smoothing functional $M_{VB}(f)$ for pixels positioned at the boundary of a block in a vertical direction, a smoothing functional $M_{VW}(f)$ for pixels positioned inside the block in a horizontal direction, a smoothing functional $M_{HB}(f)$ for pixels positioned at the boundary of a block in a horizontal direction, a smoothing functional $M_{HW}(f)$ for pixels positioned inside the block in a horizontal direction, a smoothing functional $M_T(f)$ for pixels moved and compensated in the temporal section, "f" indicating the original image.

4. (Amended) The method according to claim 1 [3], wherein the smoothing functionals $M_{VB}(f)$, $M_{HB}(f)$, $M_{VW}(f)$, $M_{HW}(f)$, $M_T(f)$ are defined as;

$$M_{VB}(f) = \|Q_{VB} f\|^2 + \alpha_{VB}\|g - f\|^2_{W1}$$
$$M_{HB}(f) = \|Q_{HB} f\|^2 + \alpha_{HB}\|g - f\|^2_{W2}$$
$$M_{VW}(f) = \|Q_{VW} f\|^2 + \alpha_{VW}\|g - f\|^2_{W3}$$
$$M_{HW}(f) = \|Q_{HW} f\|^2 + \alpha_{HW}\|g - f\|^2_{W4}$$
$$M_T(f) = \|Q_T f\|^2 + \alpha_T\|g - f\|^2_{W5}$$

Q_{VB}, Q_{VW}, Q_{HB}, Q_{HW}, Q_T indicating high pass filters for smoothing the respective pixels, α_{VB}, α_{VW}, α_{HB}, α_{HW}, α_T being regularization parameters, g being a reconstructed image, and W1, W2, W3, W4, W5 indicating diagonal matrixes for determining whether each group has an element.

14. (Amended) An apparatus for restoring a compressed image of an image processing system, comprising:

a decoder for decoding a coded image signal, and for outputting information of the restored image, such as the decoded image, a quantization variable, a macro block type and a motion vector; and

a post processing unit for including the information of the restored image inputted from the image decoder, for defining a smoothing functional including [a smoothing degree of the image and reliability of an original image block unit,] a sum of a smoothing functional $M_{VB}(f)$ for pixels positioned at the boundary of a block in a vertical direction, a smoothing functional $M_{VW}(f)$ for

pixels positioned inside the block in a horizontal direction, a smoothing functional M_{HB} (f) for pixels positioned at the boundary of a block in a horizontal direction, a smoothing functional M_{HW} (f) for pixels positioned inside the block in a horizontal direction, a smoothing functional M_T(f) for pixels moved and compensated in the temporal section, "f" indicating the original image, and for performing a gradient operation on the smoothing functional in regard to the original image,

the smoothing functional including a regularization parameter having weight of reliability for the original image.

Claims 15-27 have been added.